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FOREST SURVEY RELEASE NO. 16

WESTERN RED CEDAR POLE RESOURCES IN NORTH IDAHO AND NORTHEASTERN WASHINGTON

A FOREST SURVEY PROGRESS REPORT



U.S. DEPARTMENT OF AGRICULTURE FOREST SERVICE

NORTHERN ROCKY MOUNTAIN
FOREST AND RANGE EXPERIMENT STATION
MISSOULA, MONTANA.

M. BRADNER DIRECTOR

BY FOREST SURVEY STAFF

L.J. CUMMINGS & R.M. VARNEY

Foreword

The nationwide Forest Survey authorized by the McSweeney-McNary Forest Research Act of 1928 was initiated by the Northern Rocky Mountain Forest and Range Experiment Station during 1932. This survey has five objectives: (1) to make an inventory of the present supply of timber and other forest products, (2) to ascertain the rate at which this supply is being increased through growth, (3) to determine the rate at which this supply is being diminished through industrial and local use, windfall, fire, insects, and disease, (4) to determine the present requirement and the probable future requirement for timber and other forest products, and (5) to correlate these findings with each other and with existing and anticipated economic conditions, in order to provide a basis for the formulation of regional and national policies consistent with the most effective use of land suitable for forest production.

Inventory statistics of cedar poles in sawtimber stands were furnished by the inventory phase of the Forest Survey. Depletion data were furnished by the Division of Forest Products. Other information was gathered by a special survey of cedar pole resources during 1937-38 by the authors.

Acknowledgement is due the following for having taken part in this study:

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CANADA



Introduction

In a pole market largely supplied by various species of cedar for the past 40 years, western red cedar has occupied a prominent place. From about 1906, when it began to provide serious sales competition until the early twenties when it assumed leadership, this tree furnished a growing proportion of total poles purchased. Statistics for the period from 1920-30 indicate that the purchases of western red cedar poles exceeded those of any other species and amounted to 30 percent of total consumption. Although a declining demand affecting all pole-producing cedars has since reduced this proportion to 20 percent, it still outranks all competitors excepting the southern pines as a group.

Any reference to the past, present, or future importance of western red cedar as pole timber concerns particularly the region dealt with in this report. Northern Idaho and northeastern Washington as a unit has led in the past, is leading at present, and from all indications, will continue to lead for the next two to three decades in the production of poles. Until about 1930 production here amounted to an estimated 60 percent of the total, the remaining 40 percent coming principally from western Washington and British Columbia and to a minor extent from western Oregon and western Montana.

The purpose of this report is to give a comprehensive picture of the cedar pole resource of this region by discussing (1) present supplies, (2) present and potential growth, (3) past, present and predicted future drain, and (4) sustained yield possibilities.

The basis of growth estimates herein consists of: first, 1,375 one-twentieth-acre plots so located as to systematically cover nonsawtimber cedar-bearing stands throughout the unit; secondly, 3,660 one-twentieth-acre plots randomly selected and involving more than 100 miles of line in sawtimber stands. From these plots measurements of diameter growth, length, and mortality were recorded and analyzed to provide the means for computing growth from basic forest survey statistics.

Pole inventory figures in sawlog stands are those released by the forest survey while depletion data were derived from the references listed on page 39.

FINDINGS IN BRIEF

PRESENT INVENTORY

Remaining supplies amount to: 7,260,000 poles in sawtimber stands
780,000 poles in nonsawtimber stands

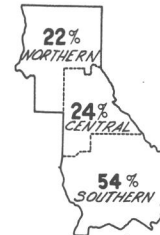
Ownership is divided among public and private agencies as follows:

Private	49.9 %
Federal	26.0 %
State and county	24.1 %



Distribution of remaining supplies is as follows:

Northern producing areas	22 %
Central producing areas	24 %
Southern producing areas	54 %

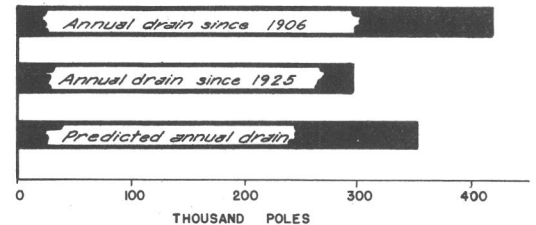


DRAIN

Past drain since 1906 has averaged about 400,000 poles annually.

Drain since 1925 has averaged approximately 300,000 poles annually.

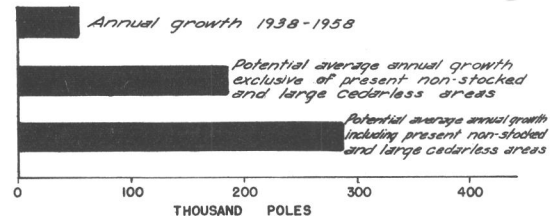
Future drain as indicated by present trends may approximate 360,000 poles annually.



GROWTH

Twenty-year growth estimates indicate that 1,139,000 undersized trees will attain pole size or 56,950 annually.

Potential annual productive capacity is estimated at 186,000 poles if present nonstocked and cedarless pole growing lands are excluded, and 288,000 if they are not.



CONCLUSIONS

1. Indicated future drain exceeds present growth as well as growth possible under intensive management.
2. If maintained, a drain of 360,000 will exhaust present supplies plus growth in from 22 to 25 years, after which this region will enter into a 20 to 40 year period of low production.
3. To achieve sustained yield, drain must be reduced to about 200,000 poles annually. If this is done in the near future, it is estimated that present supplies will last 45 to 50 years and no lapse in production will occur.

Area

The geographic unit here considered includes three counties in northeastern Washington and all of northern Idaho as far south as the Salmon River. It is bounded on the north by Canada, on the west by the Columbia Plateau and on the east by the Bitterroot Mountains. Within it lie some of the most valuable forest lands in the Pacific Northwest. More particularly it contains the main body of western white pine forest within which are concentrated the important cedar pole-producing areas dealt with in this report.

Topography

Most of the total land area and nearly all of the forest land of North Idaho and northeastern Washington lie on the slopes of three mountain systems, the Selkirk Mountains in the north, the Coeur d'Alenes in the central portion, and the Clearwater Mountains in the south.

The Selkirks, a sprawling series of north-south hogbacks gradually recede from their highest and most rugged sector near Bonners Ferry to low and gently rounded hills along the Columbia River and the western shores of Lake Coeur d'Alene. This Range is more or less segmented by the Clarks Fork of the Pend Oreille in passing from Pend Oreille Lake into Washington, thence northward into British Columbia. Drainage for the most part takes place via streams tributary to the Clarks Fork.

The Coeur d'Alene Mountains include all the mountainous area from Pend Oreille Lake southward to the headwaters of the Clearwater River. They are bounded on the west by the Columbia Plateau and on the east by the Bitterroot Mountains, along whose irregular crest lies the Idaho-Montana boundary. This Range reaches moderate elevations and is drained westward by the Coeur d'Alene, St. Joe, and St. Maries Rivers, all emptying into Coeur d'Alene Lake and thence into the Columbia by way of the Spokane River.

The Clearwater Mountains begin where the Coeur d'Alenes terminate and occupy all that area lying within the drainage of the much ramified Clearwater River. Merging into the Bitterroots on the east, this range is defined on the south by the Salmon River drainage, and on the west by the Columbia River Plateau through which the Clearwater



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Plate 1. - A timbered portion of the Clearwater Mountains as seen by the aerial photographer. Photograph by courtesy of 116th Photo Section of the Washington National Guard.

River has cut a deep canyon to the Snake River. As in the case of the Coeur d'Alenes, the Clearwater Mountains are of uniform relief. To the aerial photographer, they present a vast expanse of ridges of approximately the same height, much alike and broken only to a small extent by the main streams (plate 1).

Lying at the base of the western foothills of these three principal ranges, is the Columbia Plateau, a fertile extensive area of loess-mantled lava beds emanating from central Oregon. Treeless excepting for an irregular forest belt adjacent to the foothills, this plain traces an irregular line of contact beginning near Spokane and extending eastward into Idaho to the west shore of Coeur d'Alene Lake, thence southeasterly along the mountains to the Salmon River. Through it eventually pass all the waters drained from the region here considered, and in it have been eroded spectacular canyons by the Clearwater, Salmon, and Snake Rivers.

Forest cover

If a type map of this region were to be superimposed upon a relief map, it would be readily apparent that the forest land occurs principally in mountainous areas. It would also be seen that there is a transition of forest types from the low semi-arid region fringing the Columbia Plateau to the moist mountain slopes on the east.

Between the treeless areas of the Columbia Plateau and the mountainous region is the ponderosa pine forest which forms a narrow, almost contiguous belt from the Salmon River to the Canadian boundary. Composed of almost pure ponderosa pine in that portion which encroaches upon the plateau, toward the foothills it becomes more and more a mixture of several species and finally merges into the mixed forests between it and the white pine type.

The mixed forests adjacent to the Ponderosa pine are more or less transitional between this relatively dry type and the white pine forests. They occupy considerable areas west of the Clarks Fork River in the north and to the south of the Middle Fork of the Clearwater River, but constitute a very narrow belt in the central portion of the region. Composition ranges from pure Douglas fir or lodgepole pine to many combinations of coniferous species. In general, the dominant type species are western larch and Douglas fir in the north and central sections, and Douglas fir, lowland white fir, and lodgepole pine in the south.

The white pine forest extends over more area than any other forest in the Idaho panhandle. It occupies almost completely that portion of the Selkirk Mountains east of Clarks Fork River and in general covers the entire expanse of Coeur d'Alene and Clearwater Mountains from Pend Oreille Lake to the Middle Fork of the Clearwater River. Containing localized areas of semi-arid transitional subalpine types, this forest is a highly variable mixture of several coniferous species. From the Coeur d'Alene-Clearwater Divide northward, it is made up primarily of western white pine, western red cedar, western hemlock, western larch, lowland white fir, Douglas fir, Engelmann spruce, and lodgepole pine. To the south of the Divide it is composed of the above species with the exception of western hemlock.

Relation of western red cedar to the general forest cover

The close association of western red cedar with white pine in this region is clearly indicated by the following tabulation (table 1) showing the occurrence of cedar poles in 11 timber types recognized by the Forest Survey:




Table 1. - Cedar poles in sawtimber stands,
January 1, 1938.

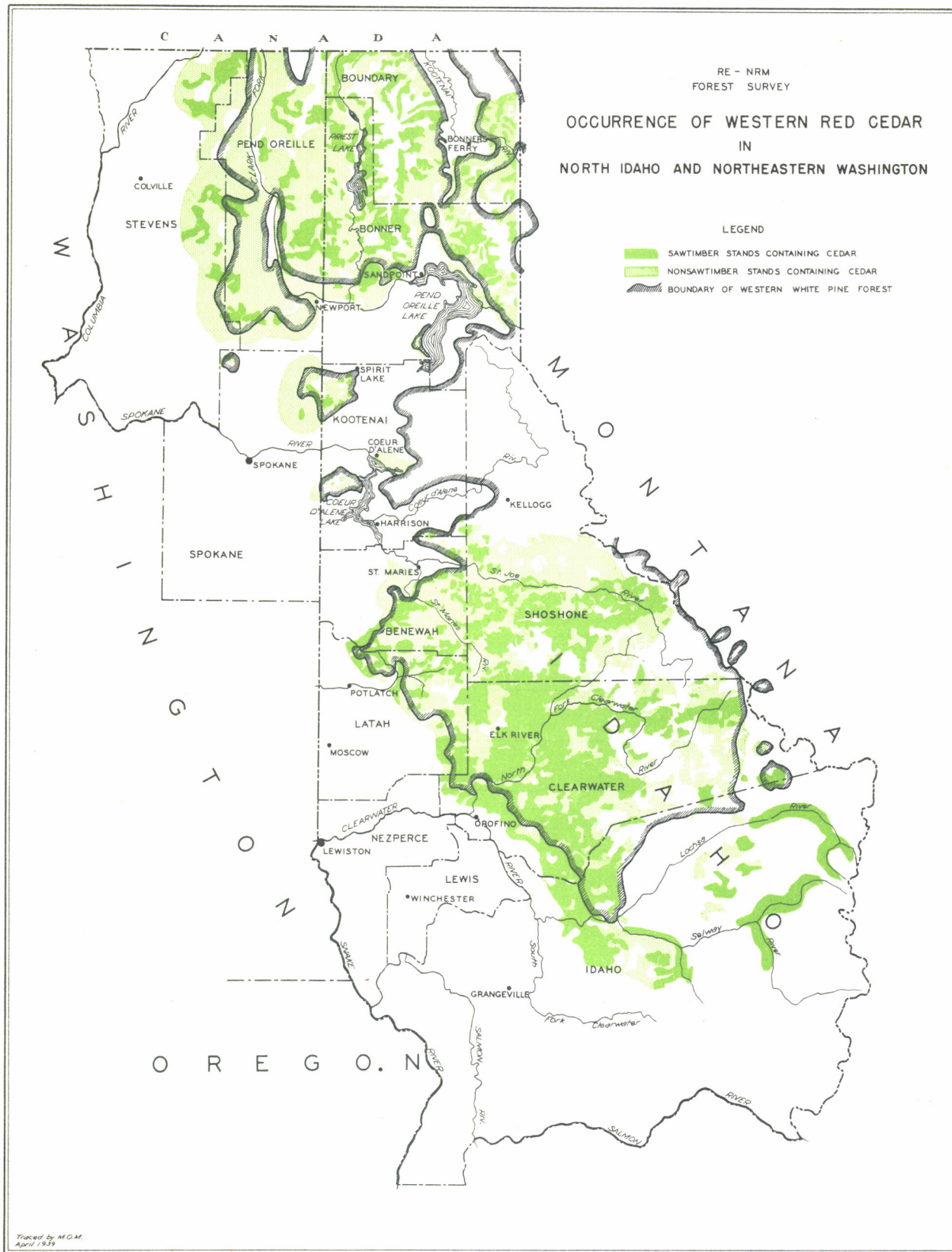
Timber type	: Total : poles	:Percent of: : total	: Poles per : acre
Western white pine	5,847,170	60.54	5.1
Western red cedar-			
lowland white fir	531,430	7.32	4.6
Western larch-Douglas			
fir	305,640	4.21	.6
Western red cedar	268,620	3.70	5.2
Ponderosa pine	169,160	2.33	0.15
Douglas fir	76,960	1.06	.3
Western hemlock-			
lowland white fir	37,750	.52	.2
Engelmann spruce	22,510	.31	.1
Lodgepole pine	730	.01	.01
Cottonwood	0	0	0
Subalpine	0	0	0
Total	7,259,970	100.00	

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OCCURRENCE OF WESTERN RED CEDAR
IN
NORTH IDAHO AND NORTHEASTERN WASHINGTON

LEGEND

-  SAWTIMBER STANDS CONTAINING CEDAR
-  NONSAWTIMBER STANDS CONTAINING CEDAR
-  BOUNDARY OF WESTERN WHITE PINE FOREST



As shown by this tabulation, approximately 81 percent of the present inventory of cedar poles in sawtimber stands occurs within the white pine type.

This close association is further emphasized by the map on the opposite page which shows the location of cedar bearing forest land. From this it is evident that although minor areas of cedar bearing lands extend beyond, the bulk is confined within the limits of white pine forest.

It is also apparent from the map that the occurrence of cedar is sporadic. This is characteristic even in the white pine forest where extensive areas of pole bearing lands lie adjacent to otherwise similar areas having practically no cedar. For example, it is seen that in the central portion of the map a large area of white pine forest within the drainage of Coeur d'Alene River is cedarless although cedar occurs to the north and south.

Characteristics of western red cedar pole stands

The characteristically even-aged western cedar pole-producing forest in this region is usually a mixture of several coniferous species. Western white pine or western larch nearly always occupy uppermost positions in the canopy of this mixture; western hemlock, lowland white fir, Engelmann spruce, Douglas fir, and lodgepole pine occur in varying amounts in intermediate positions; while cedar always seeks out the lower levels earning well its reputation as a shade-loving or "tolerant" tree.

Cedar develops as an understory until long after the stand fully matures. Not until an age of 300 to 500 years is attained does it come into its own in the canopy, and then only as a result of its longevity. Since it sometimes lives more than a thousand years, an age not often approached by its associates, cedar may eventually take over the forest and form pure cedar groves similar to that shown in plate 3, which are a joy to the recreationist as well as the despair of those interested primarily in pole values.

At such an age, however, the stand will have long passed its most useful stage for producing poles, the most favorable period for the harvesting of which usually occurs between the ages of 120 and 150 years, similar to that shown in plate 2. An analysis of data collected in this study shows the following average number of poles per acre and the length of poles produced in white pine stands grouped by 20-year age class intervals:



Plate 2. - Typical thrifty white pine saw-timber with a cedar pole understory of high value.

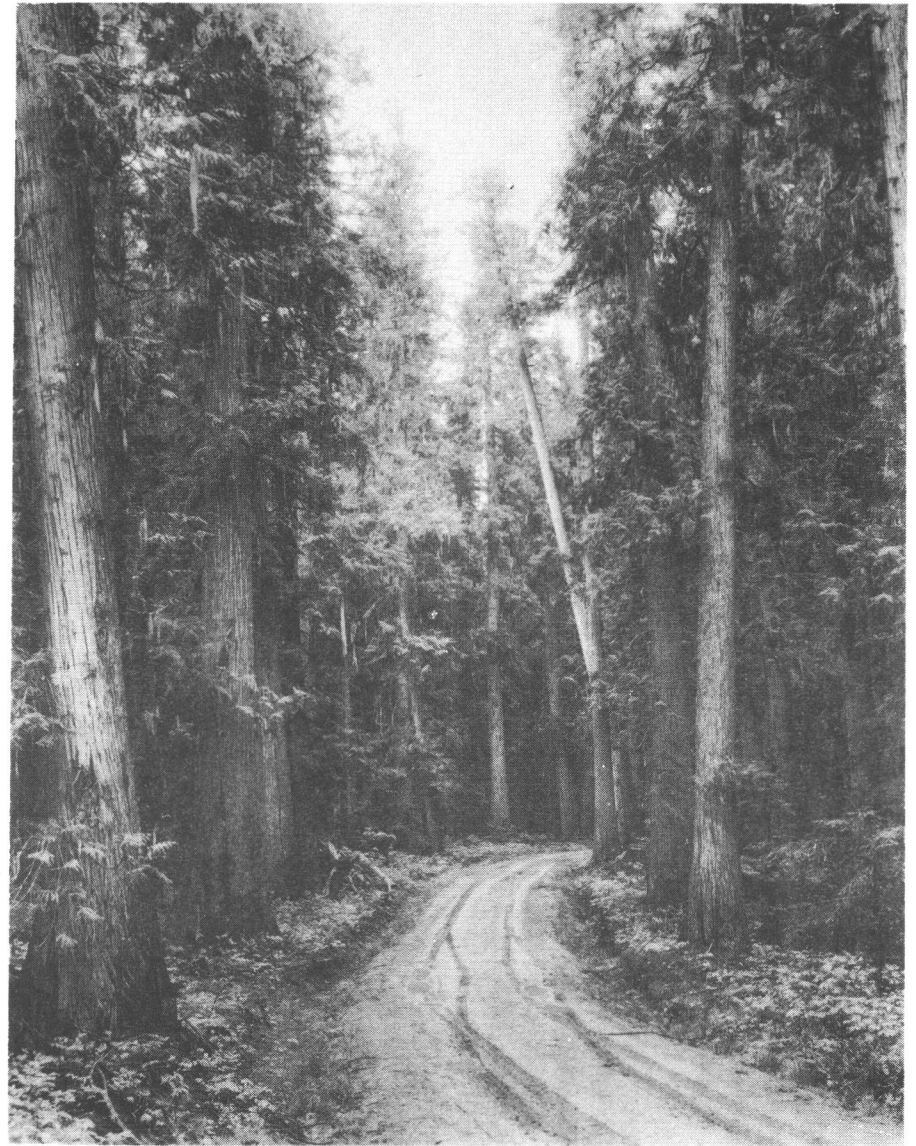


Plate 3. - Overmature pure cedar forest, a grove that is a joy to the recreationist as well as the despair of those interested primarily in pole values.

Table 2. - Average yields of poles per acre
in western white pine stands.

Average age of stand	:	60	:	80	:	100	:	120	:	140	:	160	:	180	:	200+
Number of poles per acre	:	.4	:	1.2	:	4.8	:	8.2	:	9.3	:	7.2	:	6.3	:	2.4
Length of average pole	:	25	:	25	:	30	:	35	:	35	:	40	:	40	:	40
Range of length	:	25-60 ft		:	25-90 feet		:	25-90 feet		:	25-90 feet		:			:

These data indicate that peak yields occur in stands 120-140 years old at which stage the majority of potential pole trees have grown to pole size, and very few, if any, have grown beyond the 24-inch maximum diameter limit. At this time pole quality is excellent, a 25 to 90 foot range of pole lengths is available, and in general the cedar stand attains its highest value as a pole crop.

From an age of about 140-160 years the cedar pole stand begins a gradual decline. Some of the pole trees grow beyond the maximum diameter limit and others are lost through defect, so that the numbers that are of acceptable pole size and quality constantly decrease. Until an age of 200-250 years is reached, most stands retain pole values but beyond that, poles are usually so few and scattered that they offer little opportunity to the commercial operator.

The commercial pole areas of this region are usually restricted to a zone which is generally several hundred feet lower than the altitudinal limits of commercial white pine. Within this restricted zone yields are usually heavy enough to constitute satisfactory pole-making chances.

An analysis of samples of 100 drainages of white pine sawtimber selected at random shows the following occurrence of poles on pole-producing area.

<u>Range of poles per acre</u>	<u>Area producing poles</u>
<u>Number</u>	<u>Percent</u>
1-5	43
6-10	23
11-20	20
21-30	8
31-40	5
41-50	1



Plate 4. - The cedar pole maker works alone felling, bucking, and peeling out 8-12 poles per day.



Plate 5. - Hand loading cedar poles for a truck haul.

The average number of poles per acre on pole-producing area is ten. Since about 50 percent of it is nonpole-producing, however, the white pine sawtimber area as a whole averages five poles per acre (table 1).

It is seen, therefore, that where they occur at all, poles are quite abundant. This together with the fact that the pole crop is closely associated with white pine sawtimber gives the region distinct advantages over others concerned with the production of western red cedar poles and accounts for its leadership in production.

Cedar poles in sawtimber stands

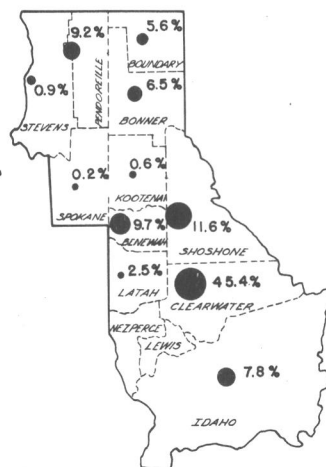
The remaining supply of cedar poles^{1/} on sawtimber areas of northeastern Washington and North Idaho is estimated to be 7,260,000 pieces. The segregation of these poles by county is shown in tables 8-20, pages 24-36. These are evenly divided between public and private ownership, 49.9 percent private and 50.1 percent public. The following tabulation shows the distribution of cedar poles in sawtimber stands by ownership class and county, January 1, 1938:

Table 3. - Distribution of cedar poles in sawtimber stands, January 1, 1938.

County	Ownership class			Total
	Private	State and county	National Forest	
Spokane	14,980	1,070		16,050
Stevens	49,520	8,240	6,620	64,380
Pend Oreille	454,880	24,010	188,090	666,980
Boundary	149,670	82,150	174,880	406,700
Bonner	135,620	230,740	104,550	470,910
Kootenai	22,770	8,180	12,090	43,040
Shoshone	416,830	121,750	306,910	845,490
Benewah	601,740	49,910	51,320	702,970
Latah	150,060	9,480	19,320	178,860
Clearwater	1,716,360	1,110,190	467,780	3,294,330
Idaho	570	13,120	556,570	570,260
Nez Perce				
Lewis				
Total	3,713,000	1,658,840	1,888,130	7,259,970

^{1/} For cruising cedar poles on the Forest Survey "Standard Manufacturing Specifications for Western Red Cedar Poles and Piling" was used, (see page 38). No trees were cruised as poles that (1) contained a pole less than 25 feet long with a minimum top diameter of 6 inches or (2) exceeded 24.9 inches d.b.h.

As a result of past cutting operations in the northern and central sections of the region, 54 percent of the present supply is now concentrated in the southern division, in Clearwater and Idaho Counties. Clearwater County alone contains 46 percent of the total. The relative distribution of poles by county is shown on the insert map.



The northern and central divisions of the region now contain 22 percent and 24 percent, respectively.

Merchantable cedar poles on sawtimber areas vary in length from 25 feet to 90 feet, averaging 37 feet.^{1/} According to data analyzed in this study the length class distribution is as follows:

<u>Pole length - feet</u>	<u>Percent of total poles</u>
25	20
30	22
35	16
40	12
45	9
50	8
55	5
60	4
65	2
70	1
75-90	1

^{1/} Cedar pole lengths were estimated by the Girard Form Class Taper Method described in Applied Forestry Note No. 88, by The Northern Rocky Mountain Forest Experiment Station

Cedar poles in nonsawtimber stands

In addition to the cedar poles in merchantable sawtimber stands, there are 777,280 poles^{1/} of merchantable size in pole, seedling and sapling stands. Although economically unavailable at present, these provide the nucleus of what will be a contributing source of production within a few years as well as the main supply 30 or 40 years hence. These poles range in length from 25 to 55 feet, averaging nearly 30 feet and occur largely in stands older than 60 years. The following table and diagram show the distribution of poles in nonsawtimber stands by county:

Table 4. - Distribution of cedar poles in nonsawtimber stands.

County	Number of poles	Percent of total	Distribution of poles on nonsawtimber stands
Spokane	8,910	1.2	
Stevens	11,690	1.5	
Pend Oreille	127,320	16.4	
Boundary	135,060	17.4	
Bonner	223,850	28.8	
Kootenai	74,900	9.6	
Shoshone	43,560	5.6	
Benewah	56,850	7.3	
Latah	32,140	4.1	
Clearwater	37,200	4.8	
Idaho	25,800	3.3	
Nez Perce	0	0	
Lewis	0	0	
Total	777,280	100.0	

^{1/} The distribution of cedar poles in nonsawtimber stands by county and length class is shown by table 19, page 35.

The following table and diagram show the distribution of nonsawtimber pole-producing land by county:

Table 5.- Distribution of nonsawtimber pole-producing land.

County	Pole-growing non-sawtimber land ^{1/} Acres	Percent of total	Distribution of nonsawtimber pole-growing land
Spokane	13,500	.9	
Stevens	16,800	1.1	
Pend Oreille	238,200	15.4	
Boundary	124,200	8.1	
Bonner	265,200	17.2	
Kootenai	22,500	1.5	
Shoshone	300,000	19.4	
Benewah	120,600	7.7	
Latah	123,000	8.0	
Clearwater	299,300	19.4	
Idaho	20,900	1.3	
Nez Perce	0	0	
Lewis	0	0	
Total	1,544,200	100.0	

^{1/} Acreage within large cedarless areas not included in this tabulation.

As shown by these data, there are greater amounts of poles and pole-growing area in the northern and central counties. This is a compensative feature of the intensive depletion which has been in progress there for the past 50 years or more.

Of the 1,544,200 acres of nonsawtimber pole-growing lands, 67 percent is publicly owned - 57 percent by the national forests, and 10 percent by State and county combined. This indicates that unless ownership changes in the future the majority of the cedar poles which originate from the present young stands will be on national forest lands. The following tabulation shows the distribution by ownership:

<u>Ownership class</u>	<u>Percent area</u>
Private	32.7
State and county	10.5
Federal	56.6
State and Federal reserved from cutting	0.2

Growth

In sawtimber stands as well as in nonsawtimber stands the problem of predicting the growth of cedar poles is to determine the rate at which undersized trees graduate into pole size and the rate at which pole material diminishes through various loss factors. However, since poles in sawtimber stands are economically available while those in nonsawtimber stands are not, the most satisfactory approach to a discussion of growth is to treat each separately.

Growth data indicate that increases in the number of poles in present sawtimber stands will be very slight during the next twenty years. It is expected that 359,000 poles will accrue to the present inventory of seven and one-quarter million, an increase of only five percent for the period, or .25 percent annually.

The reason for this is that a preponderance of these stands have passed the optimum age for producing cedar poles as indicated by table 6 showing the age distribution of present white pine sawtimber area:

Table 6. - Age distribution of the white pine type

Age group	Sawtimber stands		Nonsawtimber stand		Total	
	Area	Percent	Area	Percent	Area	Percent
1-20	:	:	591,594	43.8	591,594	23.8
21-40	:	:	351,592	25.9	351,592	14.2
41-60	426	.1	296,757	21.9	297,183	12.0
61-80	12,989	1.1	85,793	6.4	98,782	4.0
81-100	46,974	4.1	26,209	1.9	73,183	3.0
101-120	256,994	22.4	1,199	.1	255,795	10.3
121-140	221,515	19.3	:	:	221,515	8.8
141-160	126,271	11.1	:	:	126,271	5.0
161-200	179,629	15.7	:	:	179,629	7.0
200+	299,924	26.2	:	:	299,924	11.9
Total	1,144,722	100.0	1,352,744	100.0	2,497,460	100.0

This tabulation shows that 74 percent of the total sawtimber area is occupied by stands older than 120 years, an age beyond which few poles grow into pole size. Also, over a quarter of the total area supports stands more than 200 years of age in which pole timber is deteriorating at approximately seven percent per decade.

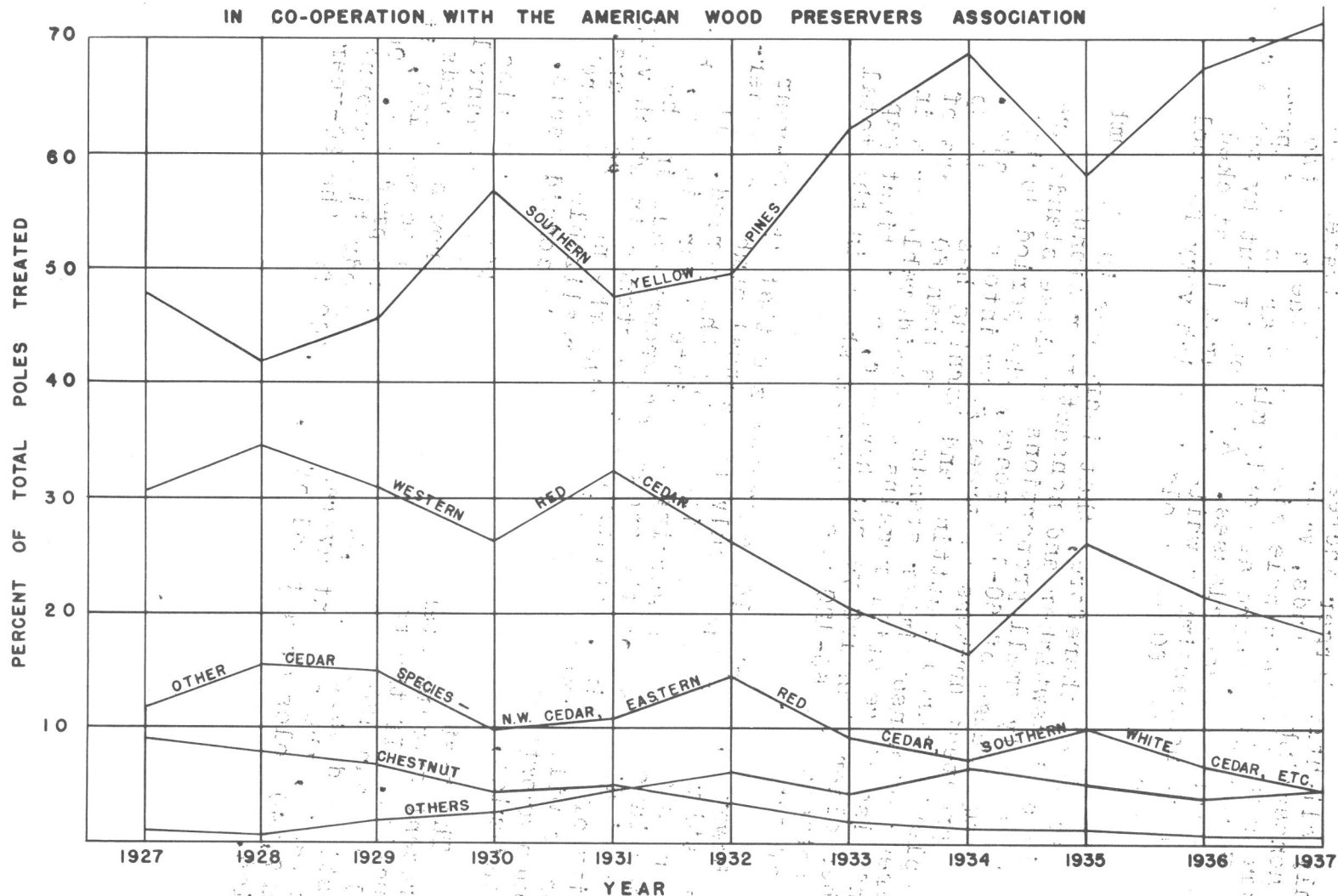
Only slightly larger increases are expected to occur in young nonsawtimber stands, where it is estimated that 780,000 trees will attain pole size within the next two decades. Here again, there are only minor areas in important pole-productive age classes. As brought out by table 6, 91.5 percent of nonsawtimber white pine area is stocked with stands less than 60 years old in which very few poles occur.

It is seen, therefore, that increases in the number of poles in both sawtimber and nonsawtimber stands are small because only small proportions of these stands are within the age range of 60-120 years, the period during which the greatest numbers of trees grow into pole size. Heavy depletion through cutting and burning has built up large areas of nonsawtimber stands less than 60 years of age, and also there still remains a considerable area in sawtimber older than 120 years; however, a distinct gap exists between the 60-120 age group as shown in the total column of table 6.

However, it should be emphasized that the 20-year growth estimate considers only the actual number of undersized trees attaining pole size during the period. It provides information regarding immediate future income, but gives no indication of the amount of growth made in the majority of seedling, sapling and pole stands in which very few trees will grow to pole size during the next 20 years. Although growth in such stands is not realizable in merchantable material, its potential importance is considerable.

The best means of measuring growth potentialities of present growing stands is the estimated average annual production. If the total acreage of pole growing stands now less than 120 years of age be projected to age 120, it is estimated that 15,269,000 poles would be produced. On this basis, the present average annual production amounts to 127,240 poles or a total of 2,544,800 for the 20-year period.

IN CO-OPERATION WITH THE AMERICAN WOOD PRESERVERS ASSOCIATION



Past drain

This region has contributed to the total annual pole production in the United States since about 1900. There is also evidence of poles being cut prior to that time although there are no available statistics as to amount. The earliest record indicates that about 570,000 western red cedar poles were cut in 1915, practically all of which were taken from North Idaho and northeastern Washington since neither Canada nor western Washington were important producers at that time.

In the Capper Report of 1920, average annual depletion for North Idaho alone was estimated at about 250,000 poles. Bureau of Census figures on the number of cedar poles produced annually since 1925 are available in the last column of table 7. Not until 1935, however, were such surveys expanded to include northeastern Washington at which time production in that section had taken a decided slump. Thus it is that with the exception of 1935 and 1937 census reports and a special survey made in 1930, no information is available for this important portion of the region. The picture of past drain is therefore sketchy and incomplete, and estimates are at best rather rough.

Nevertheless, certain things are apparent from an examination of available statistics: annual production from this region since about 1906 has averaged approximately 400,000 poles per year; since 1925, it has averaged about 300,000.

The period of greatest production was from about 1910-28 during which annual output often exceeded 500,000. The lowest production on record is the 1933 cut of less than 20,000 poles.

Future drain

Foremost in determining the magnitude of future consumption are the general market demands for poles, and the demand for western red cedar poles in particular. Annual statistics dating from 1906 show that the total poles purchased annually in the United States is a remarkably stable figure ranging from three to four and one-half million pieces and averaging 3,600,000. With the exception of recent depression years when it dropped to a low of one and one-half million, the number has consistently amounted to between three and four million, exceeding the latter only three times in all the years for which data are available.

Since these statistics indicate that the market absorbs a relatively constant number of poles, the principal consideration is the proportion of the total which has been and may be expected to be supplied by western red cedar. Graph 1 based on preservative treatment records from 1927-37, compiled by the U. S. Forest Service in cooperation with the American Wood Preservers Association, provides the best available picture of recent trends. Since the numbers of poles undergoing preservative treatment have averaged more than 95 percent of the totals purchased since 1927, this graph presents a reliable account of what has taken place in the pole market during the past decade.

As shown in this graph, the proportion of western red cedar has decreased from more than 30 percent of the total pole supply in 1927 to slightly less than 20 percent in 1937. Coincidentally, the number of poles dropped from about one and one-quarter million in 1927 to three-quarters million in 1937, despite the fact that the latter year is one of the best on record in the general pole market.

Judging from the foregoing data, a reasonable basis for approximating future drain is to assume that the general consumption of poles will continue at the same rate as in the past 32 years and that 20 percent of the total will consist of western red cedar. The annual depletion thus computed amounts to 720,000 cedar poles. Statistics for 1930-37 indicate that 50 percent or 360,000 poles may be expected to be produced in North Idaho and northeastern Washington.

Potential productive capacity

As pointed out in the growth section 74 percent of the present pole-producing sawtimber area is stocked with timber that has passed the period of maximum pole production. It is obvious, therefore, that yields now obtained are not as great as they would be under a system of management that would require cutting at an earlier age.

Table 2 on page 7 indicates that white pine sawtimber stands aged 120 years, the rotation age commonly accepted as most desirable in growing white pine, produce an average of eight cedar poles per acre instead of the present five-poles-per-acre average. Since four-fifths of all cedar poles occur within the white pine type, this rotation period and this average yield are used to

approximate the potential pole growing capacity of the region.

The area to which these are to be applied comprises all the forest lands which are considered suitable for growing cedar poles, and is divided according to whether stocked or nonstocked as follows:

Stocked	3,410,000 acres
Nonstocked	<u>916,000 acres</u>
Total	4,326,000 acres

If the entire four and one-third million acres were so managed as to produce eight poles per acre in 120 years, the total number grown would amount to 34,608,000 poles and permit an annual drain of 288,400.

However, since it is uncertain whether the nonstocked areas will restock to produce poles, and since large cedarless areas such as those in the Coeur d'Alene River drainage are not likely to produce poles for many years, a more practical estimate is obtained if these lands are deducted. If this is done, the four and one-third million acres suitable for pole production are reduced by 916,000 acres of nonstocked land and 620,000 acres of cedarless land leaving a remainder of 2,790,000 acres. Accordingly, the total number of poles grown would be reduced to 22,320,000 and the permissible annual drain to 186,000.

It is interesting to compare the foregoing with similar estimates made for North Idaho and Montana in connection with the Capper Report in 1920. The rotation period, the anticipated yield, and suitable pole-growing acreage used therein, all check fairly well as shown by the following comparison:

	Estimated in <u>Capper Report</u>	Estimate based on Forest Survey <u>data 1938</u>
Rotation period	120 years	120 years
Estimated acreage of suitable pole-growing land	2,200,100 A	2,790,000 A
Anticipated yield per A	6 poles	8 poles
Total produced during one rotation	13,200,000 poles	22,320,000 poles
Average annual growth	110,000 poles	186,000 poles

Sustained yield possibilities

Preceding sections indicate a future drain of 360,000 poles and a present practicable productive capacity of only 186,000. It is obvious, therefore, that the predicted drain is more than the region will continuously support under existing conditions even though a favorable management system be followed. How long, then, may such an excessive annual cut be continued, and into what difficulties will it eventually lead?

Twenty-year growth estimates modify present inventories as follows:

	<u>Now</u>	<u>Twenty years hence</u>
Cedar poles in present sawtimber stands	7,260,000	7,619,000
Cedar poles in present nonsawtimber stands	<u>780,000</u>	<u>1,560,000</u>
Total	8,040,000	9,179,000

From this it is seen that 20 years hence the number in both sawtimber and nonsawtimber stands will amount to 9,179,000 poles. If all were utilized at the rate of 360,000 annually, complete exhaustion would occur in 25 years. However, since it is to be anticipated that certain proportions of the total will be economically unavailable as is the case today, practical exhaustion would doubtlessly occur somewhat sooner. Irrespective of whether the exact length of time required be 22 or 25 years, the important fact is that an annual drain of 360,000 poles would bring about almost complete depletion slightly more than two decades hence. Following this event, it is certain that this region would enter into a 20 or 40 year period of low production until substantial acreages of young nonsawtimber stands attain pole-producing status.

It is apparent, therefore, that if sustained yield is to be achieved, a smaller output is necessary. The annual depletion indicated as being most suitable for effecting sustained yield is 200,000 poles, or approximately the amount of the estimated productive capacity of the region. If this is to be the amount of future drain, the total of 9,179,000 poles will provide a supply for at least 45 years and possibly 50, if additional growth be considered. By that time, it is estimated, that nonsawtimber stands will have developed to a point where no lapse in production will occur.

In order to show a comprehensive picture of trends in cedar pole production, the effect of past cutting activities and the probable future importance of the localized producing areas, the region has been divided into three economic divisions; namely, northern central, and southern (see map preceding page 1). In the following pages each division is discussed in the order named.

Following these discussions are (1) county tables showing the inventory of cedar poles in sawtimber stands for 1938, and the estimated inventory for 1948 and 1958 (tables 8-18), (2) inventory of cedar poles in pole, seedling, and sapling stands of North Idaho and northeastern Washington by county for 1938, and the estimated inventory for 1948 and 1958 (table 19), (3) manufacturing specifications for western red cedar poles and piling and (4) list of sources of depletion data.

Economic divisions

Each of the three principal mountain systems of this region contain cedar-pole producing areas that are physiographically and economically separate. On the basis of location, these areas are designated as the northern, central, and southern divisions.

The northern division includes the cedar pole areas of the Selkirk Mountains and consists of five counties, Boundary, Bonner, Pend Oreille, Stevens, and Spokane. The central division comprises the pole-producing areas in the Coeur d'Alenes and is in Kootenai, Shoshone, Benewah, and Latah Counties. The southern division includes the pole areas of the Clearwater Mountains and consists of Clearwater, Idaho, Nez Perce, and Lewis Counties.

Since earliest development of the cedar pole industry in the 1880's, cutting has centered in the northern division. Consequently, this division has led production for nearly 50 years. Since 1927, however, the industry gradually shifted southward until now it is most active in the southern division. While complete statistics for the northeastern Washington counties are not available, the following tabulation based on biennial surveys of North Idaho counties shows the increasing importance of the southern division since 1925:

Table 7. - Percentage of cedar poles produced in
North Idaho

Year	:Northern division	: Central division	: Southern division	: Total	:Number of poles produced
			Percent		
1925	43.3	47.8	8.9	100	217,559
1927	22.9	12.0	65.1	100	291,392
1929	49.7	31.3	19.0	100	447,499
1931	48.0	12.4	39.6	100	225,125
1933	31.7	28.5	39.8	100	8,659
1935	20.9	20.1	59.0	100	168,098
1937	29.4	28.1	42.5	100	353,926
Average	37.0	25.7	37.3	100	

1/ Exclusive of northeastern Washington counties.

Northern division

With the exception of only a few years, the northern division ranked first in annual production until 1933. Now, however, the supply of cedar poles which for more than 20 years furnished annual cuts of from 200,000 to 300,000 poles has dwindled to about 1,625,000 or only 22 percent of the total remaining in the region.

Past cutting has centered in the Sandpoint and the Priest River vicinities in Idaho and in eastern Pend Oreille County in Washington. Nevertheless, almost 80 percent of present supplies in this division still remains in these localities.

About one-fifth of the pole timber in this division is in that portion of the Selkirks between Bonners Ferry and the Priest Lakes. It is not likely that all the poles in this locality will ever be cut because they are either comparatively inaccessible or are concentrated in areas where recreational uses have limited utilization. Those located on the Bonners Ferry slope in steep and rocky drainages such as Myrtle Creek are relatively inaccessible, while those on the Priest Lake side are within an area of high recreational value.

Assuming that few poles will be cut from this section and that the more accessible stands will not be completely exhausted, it is estimated that this division will supply 20 percent of the total regional production during the next two decades.

As in the past, most of the poles will come from Bonner and Pend Oreille Counties, principally from the Pend Oreille Divide range along the Idaho-Washington State boundary and to lesser extent from the vicinity of Sandpoint and Priest River.

For possibly 25 years or more this division will be of minor importance in cedar pole production. After that, large areas of seedling, sapling, and pole stands will have developed to the stage where they can furnish sufficient poles to enable it to again lead.

Central division

Due to the fact that the Coeur d'Alene drainage which occupies its northern half is practically devoid of cedar, the central division has a comparatively small area of pole-producing sawtimber. Consequently, this division has never been able to compete with the northern division, although it has consistently contributed substantial proportions of the regional output.

Present supplies amount to 24 percent of the regional total and are two-thirds privately owned.

Past production has centered in the lower part of the St. Joe River drainage, in the basin of its tributary, the St. Maries River, and at the headwaters of the Palouse River. One-half of the supplies of this division still remains in these readily accessible localities. However, the intensive cutting in progress here will probably have exhausted these within a few years.

The stands which constitute the remaining half of the division's supplies are located in the upper region of the St. Joe in the basins of small tributary streams many of which are characterized by precipitous and rocky canyons. Here logging conditions are so difficult and the situation so remote, that little commercial development has hitherto been made. Plans for exploitation are nevertheless being carried out so that production from this area should soon supplement that from the more accessible locations mentioned in the foregoing paragraph. Even though development here be complete, however, depletion will probably be extended over a long period of time.

Because of the rapid cutting out of accessible stands, this division may, for a few years, continue to furnish 25 percent of regional production as it has during the past decade. Over a period of 20 years, it is estimated that the proportion will be no more than 15 percent.

Southern division

Although small scale pole cuttings have been made in the Kamiah and Weippe vicinities since about 1900, production in the southern division prior to 1927 was small in comparison to that of the northern and central divisions. Now that the latter are largely cut out, however, this division will doubtlessly retain its recently acquired position as leading producer until the large supplies located here have been depleted.

Systematic development of logging facilities since 1927 has created a producing capacity greatly in excess of present demands. Railways and truckroads now serve stands formerly considered as inaccessible; a successful low-water driving system of transporting poles has been developed; so it now appears that all but a very small proportion of pole-producing sawtimber may be reached.

The stands of this division are ideally suited for pole-making operations because they are preponderantly young and near the optimum pole-producing age. Cedar is well distributed throughout and yields are heavy, sometimes exceeding 40 poles per acre and averaging nine.

The division of pole timber supplies by ownership is about the same as for the region, 55 percent public and 45 percent private. By counties, however, there is considerable contrast, 99.9 percent of the poles in Idaho County being publicly owned principally by national forests as compared to 48 percent in Clearwater County largely owned by the State.

Because more than half of the region supply is concentrated within it, and because of the favorable character and situation of its pole timber, the southern division can be expected to produce about 65 percent of regional output for the next 20 years. Production will come mainly from the lower part of the North Fork of the Clearwater River and its tributaries, and from the Pierce, Weippe, and Kamiah areas.

For the next 20 to 25 years it is certain that this division will lead production. Following the depletion of present stands, however, the relative absence of young potential pole material assures a long period of decline during which the divisions to the north will reassume their former importance.

RE-NRM
Forest Survey
Growth Phase

Table 8.

SPOKANE COUNTY

Number of cedar poles in sawtimber stands

	Pole length (feet)														
D.b.h.	25	30	35	40	45	50	55	60	65	70	75	80	85	90	Total
1938															
8	180	10				Less than 200 years old									190
9	320	130	10												460
10	510	350	60												920
11	510	430	200	30											1,170
12	470	440	350	80											1,340
13	370	400	380	120	80										1,350
14	300	370	330	200	170	40									1,410
15	200	310	260	190	170	140	40								1,310
16	130	240	220	200	190	170	50	10							1,210
17	80	190	190	190	180	180	80	40							1,130
18	40	120	140	150	160	190	100	70	10						980
19	30	100	110	120	130	160	110	90	60	10					920
20	20	70	80	80	90	120	120	100	80	10					770
21	10	50	50	60	70	90	110	90	70	20	10				630
22	10	30	30	40	60	70	110	80	70	40	10	10			560
23		20	20	30	40	50	90	70	50	30	10	10			420
24		10	10	20	20	30	60	50	30	20	10	10	10		280
Total	3,180	3,270	2,440	1,510	1,360	1,240	870	600	370	130	40	30	10		15,050
Total	170	150	130	120	100	More than 200 years old				30	20	10	10		1,000
Grand total	3,350	3,420	2,570	1,630	1,460	1,330	940	660	410	160	60	40	20		16,050
Predicted number of cedar poles in sawtimber stands ^{1/} All age classes															
1948															
Total	4,270	3,680	2,750	1,700	1,420	1,190	820	620	360	150	70	30	20		17,080
1958															
Total	5,070	3,740	2,920	1,690	1,270	1,020	650	430	250	100	50	30	20		17,240

^{1/} Assuming no change in area of age classes or depletion by cutting and fire.

RE-NRM
Forest Survey
Growth Phase

Table 9.

STEVENS COUNTY

Number of cedar poles in sawtimber stands

D.b.h.	Pole length (feet)														
	25	30	35	40	45	50	55	60	65	70	75	80	85	90	Total
1938															
8	810	20				Less than 200 years old									830
9	1,890	890	90												2,870
10	2,400	2,260	550	70											5,280
11	2,100	2,220	1,310	310	50										5,990
12	1,740	1,800	1,650	740	120	20									6,070
13	1,300	1,450	1,490	880	400	120									5,640
14	1,000	1,220	1,150	940	680	320	50								5,360
15	640	950	870	760	700	600	240	60							4,820
16	440	720	710	700	700	640	280	110	10						4,310
17	260	550	590	620	590	610	350	180	40						3,790
18	140	370	430	480	490	600	370	280	60	10					3,230
19	90	290	340	370	400	470	360	340	220	40	10				2,930
20	50	200	240	270	300	360	370	350	270	70	10				2,490
21	40	140	160	190	210	260	320	280	240	80	30				1,950
22	10	100	110	150	180	220	310	260	220	140	50	20			1,770
23	10	60	70	100	120	150	240	210	170	110	50	30	10		1,330
24	10	20	40	50	70	90	160	140	110	80	50	40	20	10	890
Total	12,930	13,260	9,800	6,630	5,010	4,460	3,050	2,210	1,340	530	200	90	30	10	59,550
						More than 200 years old									
Total	820	730	630	580	480	440	340	290	190	140	100	50	30	10	4,830
Grand Total	13,750	13,990	10,430	7,210	5,490	4,900	3,390	2,500	1,530	670	300	140	60	20	64,380
1948															
Total	15,650	14,110	11,170	7,460	5,600	4,750	3,120	2,390	1,350	620	300	120	60	20	66,720
1958															
Total	17,360	14,010	11,780	7,890	5,570	4,590	2,830	2,030	1,090	490	250	110	60	10	68,070

1/ Assuming no change in area of age classes or depletion by cutting and fire.

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RE-NRM
Forest Survey
Growth Phase

Table 10.
PEND OREILLE COUNTY

Number of cedar poles in sawtimber stands

	Pole length (feet)														
D.b.h.	25	30	35	40	45	50	55	60	65	70	75	80	85	90	Total
1938															
8	6,280	200				Less than 200 years old									6,480
9	12,520	6,450	690												19,660
10	19,400	17,020	3,710	450											40,580
11	18,860	18,130	9,830	2,430	330										49,580
12	16,840	16,500	14,110	5,280	780	150									53,660
13	13,080	14,330	14,160	6,800	3,560	790									52,720
14	10,390	12,750	11,410	8,180	6,550	2,680	340								52,300
15	6,730	10,240	9,000	7,200	6,760	5,860	2,130	400							48,320
16	4,610	7,910	7,480	7,060	7,120	6,460	2,490	930	80						44,140
17	2,740	6,160	6,430	6,650	6,320	6,430	3,350	1,630	250						39,960
18	1,430	4,120	4,680	5,090	5,350	6,570	3,730	2,800	540	100					34,410
19	990	3,260	3,700	4,020	4,330	5,200	3,880	3,470	2,300	400	40				31,590
20	540	2,260	2,640	2,910	3,210	3,940	3,980	3,630	2,940	650	80				26,780
21	400	1,630	1,730	2,140	2,350	2,910	3,530	3,010	2,560	790	260	30			21,340
22	170	1,110	1,210	1,560	1,920	2,450	3,480	2,860	2,330	1,450	460	240			19,240
23	130	680	760	1,030	1,300	1,590	2,730	2,250	1,770	1,210	510	330	140		14,430
24	80	280	410	590	770	960	1,810	1,490	1,190	820	520	410	190	100	9,620
Total	115,190	123,030	91,950	61,390	50,650	45,990	31,450	22,470	13,960	5,420	1,870	1,010	330	100	564,810
						More than 200 years old									
Total	17,370	15,330	13,280	12,260	10,220	9,200	7,150	6,130	4,090	3,060	2,040	1,020	710	310	102,170
Grand total	132,560	138,360	105,230	73,650	60,870	55,190	38,600	28,600	18,050	8,480	3,910	2,030	1,040	410	666,980
Predicted number of cedar poles in sawtimber stands ^{1/} All age classes															
1948															
Total	155,020	140,050	110,190	74,170	59,250	50,400	34,260	26,800	15,670	7,660	3,960	1,690	960	360	680,440
1958															
Total	175,980	139,200	114,890	75,560	55,960	46,070	29,780	21,940	12,370	5,930	3,310	1,590	900	290	683,770

^{1/} Assuming no change in area of age classes or depletion by cutting and fire.

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KE-NRM
Forest Survey
Growth Phase

Table 11.

BOUNDARY COUNTY

Number of cedar poles in sawtimber stands

	Pole length (feet)														
D.b.h.	25	30	35	40	45	50	55	60	65	70	75	80	85	90	Total
1938															
8	3,570	120			Less than 200 years old										3,690
9	6,240	2,930	220												9,390
10	10,380	7,890	1,460	90											19,820
11	10,650	9,210	4,450	930	70										25,310
12	9,830	9,170	7,410	2,090	170	30									28,700
13	7,700	8,350	8,030	2,980	1,820	160									29,040
14	6,270	7,690	6,730	4,230	3,590	1,100	70								29,680
15	4,040	6,350	5,410	4,010	3,680	3,120	960	80							27,650
16	2,780	4,960	4,550	4,150	4,130	3,640	1,170	350	20						25,750
17	1,660	3,930	3,980	4,040	3,800	3,810	1,770	800	50						23,840
18	840	2,620	2,880	3,100	3,280	4,070	2,130	1,530	250	20					20,720
19	580	2,060	2,280	2,470	2,660	3,220	2,310	1,980	1,350	210	10				19,130
20	320	1,430	1,610	1,770	1,940	2,410	2,420	2,140	1,780	350	20				16,190
21	260	1,040	1,060	1,310	1,440	1,820	2,210	1,840	1,580	420	140	10			13,130
22	110	690	720	950	1,170	1,520	2,190	1,750	1,410	840	250	130			11,730
23	80	430	450	620	790	970	1,730	1,400	1,060	720	280	180	90		8,800
24	60	170	240	350	470	590	1,150	930	710	480	300	240	120	60	5,870
Total	65,370	69,040	51,480	33,090	29,010	26,460	18,110	12,800	8,210	3,040	1,000	560	210	60	318,440
Total	15,000	13,240	11,470	10,590	More than 200 years old										
					8,830	7,940	6,180	5,300	3,530	2,650	1,770	880	620	260	88,250
Grand total	80,370	82,280	62,950	43,680	37,840	34,400	24,290	18,100	11,740	5,690	2,770	1,440	830	320	406,700
Predicted number of cedar poles in sawtimber stands ^{1/} All age classes															
1948															
Total	95,320	83,820	64,860	43,050	35,830	30,540	21,220	16,610	9,990	5,120	2,750	1,200	710	290	411,310
1958															
Total	109,360	83,740	67,470	42,670	32,720	26,910	17,940	13,090	7,720	3,830	2,280	1,110	660	230	409,730

^{1/} Assuming no change in area of age classes or depletion by cutting and fire.

RE-NRM
Forest Survey
Growth Phase

Table 12.

BONNER COUNTY

Number of cedar poles in sawtimber stands

D.b.h.	Pole length (feet)															Total
	25	30	35	40	45	50	55	60	65	70	75	80	85	90		
1938																
8	5,070	140			Less than 200 years old										5,210	
9	11,400	5,710	640												17,750	
10	15,580	14,680	3,530	460											34,250	
11	14,130	14,660	8,560	2,150	340										39,840	
12	12,010	12,300	11,070	4,810	810	160									41,160	
13	9,140	10,130	10,320	5,860	2,750	810									39,010	
14	7,080	8,700	8,020	6,370	4,770	2,250	350								37,540	
15	4,580	6,790	6,160	5,270	4,930	4,300	1,720	410							34,160	
16	3,120	5,190	5,050	4,930	4,960	4,570	1,970	800	80						30,670	
17	1,840	3,970	4,260	4,480	4,270	4,380	2,470	1,260	260						27,190	
18	990	2,660	3,100	3,410	3,550	4,310	2,620	2,030	440	100					23,210	
19	680	2,100	2,450	2,660	2,870	3,410	2,630	2,430	1,570	300	40				21,140	
20	360	1,460	1,760	1,940	2,150	2,610	2,650	2,490	1,970	470	80				17,940	
21	260	1,050	1,150	1,410	1,550	1,890	2,290	2,000	1,690	580	190	30			14,090	
22	100	720	820	1,050	1,280	1,610	2,260	1,900	1,560	1,000	330	180			12,810	
23	80	440	520	690	860	1,060	1,770	1,480	1,190	830	360	230	100		9,610	
24	50	180	280	400	510	640	1,170	970	810	570	360	280	130	60	6,410	
Total	86,470	90,880	67,690	45,890	35,600	32,000	21,900	15,770	9,570	3,850	1,360	720	230	60	411,990	
More than 200 years old																
Total	10,020	8,840	7,660	7,070	5,890	5,300	4,120	3,530	2,360	1,770	1,180	590	410	180	58,920	
Grand total	96,490	99,720	75,350	52,960	41,490	37,300	26,020	19,300	11,930	5,620	2,540	1,310	640	240	470,910	
Predicted number of cedar poles in sawtimber stands ^{1/} All age classes																
1948																
Total	112,650	102,650	81,840	55,170	42,640	36,260	24,230	18,840	10,820	5,190	2,650	1,110	620	220	494,890	
1958																
Total	126,100	101,850	85,730	57,280	41,450	34,210	21,610	15,840	8,710	4,160	2,250	1,060	600	170	501,020	

^{1/} Assuming no change in area of age classes or depletion by cutting and fire.

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RE-NRM
Forest Survey
Growth Phase

Table 13.
KOOTENAI COUNTY

Number of cedar poles in sawtimber stands

	Pole length (feet)															
D.b.h.	25	30	35	40	45	50	55	60	65	70	75	80	85	90	Total	
1938																
8	510	20						Less than 200 years old							530	
9	1,090	480	40												1,610	
10	1,440	1,230	280	20											2,970	
11	1,310	1,280	700	150	20										3,460	
12	1,120	1,110	980	360	50	10									3,630	
13	850	940	940	460	230	40									3,460	
14	670	820	750	540	410	160	20								3,370	
15	430	650	580	470	420	360	130	20							3,060	
16	290	500	480	460	450	400	150	50							2,780	
17	170	390	410	420	400	400	210	100	10						2,510	
18	90	260	300	320	340	410	230	170	30	10					2,160	
19	60	210	230	250	270	330	240	220	140	20					1,970	
20	30	140	170	180	200	250	250	230	180	40	10				1,680	
21	30	100	110	130	150	180	220	190	160	50	20				1,340	
22	10	70	70	100	120	150	220	180	150	90	30	10			1,200	
23	10	40	50	60	80	100	170	140	110	80	30	20	10		900	
24		20	30	40	50	60	110	90	70	50	30	30	10	10	600	
Total	8,110	8,260	6,120	3,960	3,190	2,850	1,950	1,390	850	340	120	60	20	10	37,230	
	More than 200 years old															
Total	990	870	750	700	580	520	410	350	230	170	120	60	40	20	5,810	
Grand total	9,100	9,130	6,870	4,660	3,770	3,370	2,360	1,740	1,080	510	240	120	60	30	43,040	
Predicted number of cedar poles in sawtimber stands ^{1/} All age classes																
1948																
Total	10,810	9,510	7,380	4,870	3,820	3,240	2,180	1,680	970	460	240	100	60	30	45,350	
1958																
Total	12,220	9,520	7,780	5,030	3,630	2,980	1,900	1,340	750	350	190	90	60	20	45,860	

^{1/} Assuming no change in area of age classes or depletion by cutting and fire.

RE-NRM
Forest Survey
Growth Phase

Table 14.

SHOSHONE COUNTY

Number of cedar poles in sawtimber stands.

	Pole length (feet)														
D.b.h.	25	30	35	40	45	50	55	60	65	70	75	80	85	90	Total
1938															
8	15,400	420					Less than 200 years old								15,820
9	35,340	21,900	3,670												60,910
10	37,910	47,810	13,690	2,660											102,070
11	27,930	37,850	26,470	8,140	1,720										102,110
12	19,120	23,070	23,790	15,050	3,440	680									85,150
13	13,110	15,120	16,780	15,020	5,690	3,120									68,840
14	8,820	10,830	10,960	12,190	8,090	5,850	1,250								57,990
15	5,360	6,970	7,160	7,680	7,540	6,860	3,540	1,250							46,360
16	3,360	4,930	5,340	5,760	5,980	5,830	3,300	1,600	210						36,310
17	1,950	3,520	4,170	4,700	4,610	4,900	3,480	1,980	620						29,930
18	1,090	2,460	3,140	3,510	3,600	4,250	3,060	2,540	660	210					24,520
19	790	1,990	2,520	2,750	2,980	3,450	2,940	3,010	1,800	440	100				22,770
20	370	1,360	1,780	1,970	2,230	2,640	2,720	2,730	2,050	610	160				18,620
21	260	1,130	1,440	1,710	1,880	2,160	2,590	2,470	2,050	980	330	80			17,080
22	60	580	790	960	1,140	1,380	1,800	1,660	1,420	1,000	380	220			11,390
23	30	310	520	630	750	910	1,240	1,170	1,100	820	460	270	80		8,290
24	20	170	410	500	600	750	1,040	1,000	1,060	810	530	400	150	80	7,520
Total	170,920	180,420	122,630	83,230	50,250	42,780	26,960	19,410	10,970	4,870	1,960	970	230	80	715,680
Total	22,070	19,470	16,870	15,580	12,980	11,680	More than 200 years old								
							9,090	7,790	5,190	3,890	2,600	1,300	910	390	129,810
Grand total	192,990	199,890	139,500	98,810	63,230	54,460	36,050	27,200	16,160	8,760	4,560	2,270	1,140	470	845,490
Predicted number of cedar poles in sawtimber stands ^{1/} All age classes															
1948															
Total	195,090	207,000	176,340	119,000	76,860	63,370	38,560	29,560	16,140	8,420	4,590	2,040	1,250	430	938,650
1958															
Total	201,380	207,840	198,240	142,950	90,330	73,270	41,930	31,480	15,840	8,330	4,400	2,060	1,270	410	1,019,730

^{1/} Assuming no change in area of age classes or depletion by cutting and fire.

RE-NRM
Forest Survey
Growth Phase

Table 15.

BENEAH COUNTY

Number of cedar poles in sawtimber stands

D.b.h.	Pole length (feet)														
	25	30	35	40	45	50	55	60	65	70	75	80	85	90	Total
1938															
8	4,640	110					Less than 200 years old								4,750
9	9,860	4,520	450												14,830
10	12,710	11,320	2,680	280											26,990
11	13,220	12,720	6,940	1,510	180										34,570
12	12,250	11,900	10,150	3,490	400	70									38,260
13	9,790	10,700	10,560	4,520	2,470	330									38,370
14	7,830	9,610	8,590	5,770	4,600	1,540	130								38,070
15	5,210	8,140	7,030	5,350	4,800	4,070	1,280	130							36,010
16	3,930	7,000	6,450	5,930	5,810	5,100	1,630	490	20						36,360
17	2,350	5,560	5,650	5,750	5,370	5,370	2,490	1,120	70						33,730
18	1,340	4,220	4,600	4,970	5,240	6,510	3,360	2,390	370	20					33,020
19	890	3,170	3,500	3,790	4,080	4,940	3,540	3,010	2,080	320	10				29,330
20	510	2,270	2,540	2,800	3,060	3,810	3,820	3,350	2,810	530	20				25,520
21	430	1,730	1,770	2,200	2,420	3,050	3,710	3,090	2,640	710	230	10			21,990
22	140	870	890	1,180	1,470	1,890	2,750	2,190	1,760	1,050	310	160			14,660
23	70	370	390	540	680	840	1,480	1,200	920	620	250	160	80		7,600
24	50	170	240	360	470	580	1,120	910	720	490	310	240	120	60	5,840
Total	85,220	94,380	72,430	48,440	41,050	38,100	25,310	17,880	11,390	3,740	1,130	570	200	60	439,900
Total	44,720	39,460	34,200	31,570	26,310	23,680	18,420	15,780	10,520	7,890	5,260	2,630	1,840	790	263,070
Grand total	129,940	133,840	106,630	80,010	67,360	61,780	43,730	33,660	21,910	11,630	6,390	3,200	2,040	850	702,970
Predicted number of cedar poles in sawtimber stands ^{1/} All age classes															
1948															
Total	147,520	140,040	112,210	81,370	65,850	57,090	40,350	31,980	19,580	11,170	6,370	2,880	1,880	790	719,080
1958															
Total	164,240	142,520	117,780	84,470	63,700	53,770	36,800	27,580	16,540	9,300	5,670	2,760	1,780	710	727,620

^{1/} Assuming no change in area of age classes or depletion by cutting and fire.

RE-NRM
Forest Survey
Growth Phase

Table 16.

LATAH COUNTY

Number of cedar poles in sawtimber stands

D.b.h.	Pole length (feet)															Total
	25	30	35	40	45	50	55	60	65	70	75	80	85	90		
1938																
8	1,450	40					Less than 200 years old								1,490	
9	2,750	1,540	200												4,490	
10	4,240	3,910	890	120											9,160	
11	4,800	4,550	2,430	610	80										12,470	
12	4,670	4,470	3,700	1,250	160	30									14,280	
13	3,830	4,160	4,020	1,650	960	150									14,770	
14	3,080	3,790	3,320	2,170	1,830	640	60								14,890	
15	2,070	3,230	2,760	2,070	1,920	1,650	530	60							14,290	
16	1,560	2,790	2,550	2,320	2,320	2,060	670	200	10						14,480	
17	940	2,220	2,250	2,280	2,150	2,160	1,010	450	30						13,490	
18	530	1,690	1,840	1,980	2,100	2,610	1,350	970	150	10					13,230	
19	360	1,270	1,410	1,520	1,640	1,990	1,420	1,210	840	130	10				11,800	
20	210	910	1,020	1,120	1,230	1,530	1,530	1,350	1,130	220	10				10,260	
21	170	700	710	890	970	1,230	1,490	1,240	1,060	290	100				8,850	
22	60	350	360	470	590	760	1,110	880	710	420	130	60			5,900	
23	30	150	160	220	280	340	590	480	370	250	100	70	30		3,070	
24	20	70	100	140	190	230	450	370	290	200	130	100	50	20	2,360	
Total	30,770	35,840	27,720	18,810	16,420	15,380	10,210	7,210	4,590	1,520	480	230	80	20	169,280	
More than 200 years old																
Total	1,630	1,440	1,240	1,150	960	860	670	570	380	290	190	100	70	30	9,580	
Grand total	32,400	37,280	28,960	19,960	17,380	16,240	10,880	7,780	4,970	1,810	670	330	150	50	178,860	
Predicted number of cedar poles in sawtimber stands ^{1/} All age classes																
1948																
Total	39,290	39,780	31,610	20,710	17,020	14,460	9,720	7,420	4,230	1,750	740	250	110	50	187,140	
1958																
Total	46,420	41,410	34,170	22,110	16,340	13,280	8,490	5,970	3,260	1,190	580	250	120	20	193,610	

^{1/} Assuming no change in area of age classes or depletion by cutting and fire.

RE-NRM
Forest Survey
Growth Phase

Table 17.

April 4, 1939

CLEARWATER COUNTY

Number of cedar poles in sawtimber stands

D.b.h.	Pole length (feet)														
	25	30	35	40	45	50	55	60	65	70	75	80	85	90	Total
1938															
8	34,000	990					Less than 200 years old								34,990
9	104,470	67,160	11,500												183,130
10	113,390	143,200	40,540	8,080											305,210
11	100,060	136,340	95,500	30,310	6,460										368,670
12	76,070	92,840	96,090	62,800	14,910	2,960									345,670
13	58,500	67,720	75,580	72,260	27,120	16,150									317,330
14	41,820	51,420	52,520	62,840	41,950	32,870	7,270								290,690
15	28,080	34,090	36,920	43,210	44,410	41,270	20,640	10,770							259,390
16	19,570	25,090	30,080	35,100	38,530	39,510	24,220	13,590	3,770						229,460
17	12,370	17,750	24,260	29,200	30,280	33,460	28,470	20,500	3,230						199,520
18	8,070	12,370	19,450	22,520	22,760	25,390	24,810	22,480	7,060	2,690					167,600
19	5,150	9,540	14,130	15,480	16,840	18,760	18,430	21,100	11,650	3,510	1,080				135,670
20	2,350	6,810	10,810	11,990	14,110	15,750	16,690	19,050	12,930	5,180	1,890				117,560
21	1,230	5,720	8,950	10,170	11,190	11,820	14,070	15,050	12,210	7,900	2,630	810			101,750
22	190	3,270	5,430	6,340	7,250	8,350	10,000	10,340	9,240	7,230	3,060	1,800			72,500
23	160	2,030	3,640	4,370	5,110	6,240	8,110	7,860	7,610	5,750	2,920	1,940	970		56,710
24	140	960	2,180	2,720	3,270	4,090	5,760	5,470	5,720	4,350	2,850	1,910	1,360	140	40,920
Total	605,620	677,300	527,580	417,390	284,190	256,620	178,470	146,210	73,420	36,610	14,430	6,460	2,330	140	3,226,770
Total	11,490	10,130	8,780	8,110	6,760	6,080	More than 200 years old								
							4,730	4,050	2,700	2,030	1,350	680	470	200	67,560
Grand total	617,110	687,430	536,360	425,500	290,950	262,700	183,200	150,260	76,120	38,640	15,780	7,140	2,800	340	3,294,330
Predicted number of cedar poles in sawtimber stands ^{1/} All age classes 1948															
Total	537,650	620,970	597,610	460,770	331,730	289,240	190,510	157,330	84,490	39,360	19,090	7,770	3,980	710	3,341,210
1958															
Total	474,030	551,650	606,170	499,150	368,240	326,560	211,510	140,340	80,520	37,200	20,790	9,210	5,140	840	3,331,350

^{1/} Assuming no change in area of age classes or depletion by cutting and fire.

RE-NRM
Forest Survey
Growth Phase

Table 18.

IDAHO COUNTY

Number of cedar poles in sawtimber stands

	Pole length (feet)															
D.b.h.		25	30	35	40	45	50	55	60	65	70	75	80	85	90	Total
1938																
8	5,620	80					Less than 200 years old									5,700
9	19,110	4,560	1,480													25,150
10	25,460	12,360	5,090	1,000												43,910
11	24,110	17,030	9,620	4,050	800											55,610
12	17,690	14,880	12,050	8,340	1,840	360										55,160
13	11,890	12,060	12,510	9,950	4,150	2,000										52,560
14	8,070	9,920	9,510	9,440	6,770	4,460	900									49,070
15	5,500	7,460	7,260	7,210	7,250	6,600	2,960	1,330								45,570
16	3,830	5,660	6,010	6,370	6,810	6,680	3,510	2,270								41,140
17	2,370	4,240	5,050	5,650	5,670	6,070	4,360	2,900	400							36,710
18	1,420	2,900	3,880	4,370	4,500	5,250	4,120	3,520	980	330						31,270
19	910	2,180	2,830	3,090	3,350	3,860	3,370	3,510	2,070	530	130					25,830
20	440	1,520	2,090	2,310	2,650	3,080	3,200	3,340	2,430	790	230					22,080
21	290	1,250	1,650	1,940	2,130	2,410	2,890	2,810	2,330	1,180	390	100				19,370
22	80	770	1,030	1,270	1,500	1,820	2,380	2,180	1,870	1,320	500	280				15,000
23	70	510	710	910	1,110	1,350	2,060	1,820	1,580	1,130	520	350	170			12,290
24	70	290	490	670	850	1,060	1,830	1,570	1,370	980	630	460	250	110		10,630
Total	126,930	97,670	81,260	66,570	49,380	45,000	31,580	25,250	13,030	6,260	2,400	1,190	420	110		547,050
Total	3,950	3,480	3,020	2,790	2,320	2,090	More than 200 years old									
							1,620	1,390	930	700	460	230	160	70		23,210
Grand Total	130,880	101,150	84,280	69,360	51,700	47,090	33,200	26,640	13,960	6,960	2,860	1,420	580	180		570,260
Predicted number of cedar poles in sawtimber stands ^{1/} All age classes																
1948																
Total	130,910	112,020	94,560	73,640	56,320	48,540	32,360	26,320	14,510	6,670	3,220	1,310	670	150		601,200
1958																
Total	124,680	123,560	105,320	76,520	60,110	51,280	33,350	24,000	11,410	5,320	3,180	1,440	780	140		621,090

^{1/} Assuming no change in area of age classes or depletion by cutting and fire.

Table 19.

NUMBER OF CEDAR POLES IN POLE, SEEDLING AND SAPLING STANDS OF
NORTH IDAHO AND NORTHEASTERN WASHINGTON COUNTIES^{1/}

Pole length (feet)											
Year :	25 :	30 :	35 :	40 :	45 :	50 :	55 :	60 :	65 :	Total	
Boundary County											
1938	63,600	39,490	22,030	8,390	1,410	130	10				135,060
1948	88,930	54,330	31,050	17,780	5,070	3,980	1,370	90			202,600
1958	109,010	70,380	44,540	27,630	8,770	6,980	2,600	210	10		270,130
Bonner County											
1938	104,920	65,950	36,510	13,900	2,330	220	20				223,850
1948	146,650	90,790	51,470	29,470	8,400	6,590	2,270	150			335,790
1958	180,680	116,660	73,830	45,800	14,530	11,560	4,300	350	20		447,730
Kootenai County											
1938	35,100	22,070	12,210	4,650	780	80	10				74,900
1948	49,060	30,370	17,220	9,860	2,810	2,210	760	50			112,540
1958	60,450	39,030	24,700	15,320	4,860	3,870	1,440	120	10		149,800
Benewah County											
1938	20,420	12,840	7,110	2,700	450	40					43,560
1948	27,610	17,330	10,320	6,100	1,880	1,490	580	50			65,360
1958	32,630	21,390	14,360	9,910	3,950	3,300	1,440	140	10		87,130
Shoshone County											
1938	26,640	16,750	9,270	3,530	590	60	10				56,850
1948	36,020	22,610	13,470	7,960	2,450	1,940	760	60			85,270
1958	42,570	27,900	18,740	12,930	5,150	4,300	1,880	180	20		113,670
Latah County											
1938	15,070	9,470	5,240	2,000	330	30					32,140
1948	20,370	12,790	7,610	4,500	1,380	1,100	430	30			48,210
1958	24,070	15,780	10,600	7,310	2,910	2,430	1,060	100	10		64,270
Clearwater County											
1938	17,430	10,960	6,070	2,310	390	40					37,200
1948	23,570	14,790	8,810	5,210	1,600	1,270	500	40			55,790
1958	27,860	18,260	12,260	8,460	3,370	2,810	1,230	120	10		74,380
Idaho County											
1938	12,090	7,600	4,210	1,600	270	30					25,800
1948	16,350	10,260	6,110	3,610	1,110	880	340	30			38,690
1958	19,320	12,660	8,500	5,870	2,340	1,950	860	90	10		51,600
Pend Oreille County											
1938	59,680	37,510	20,760	7,910	1,320	130	10				127,320
1948	83,410	51,630	29,270	16,760	4,780	3,750	1,290	90			190,980
1958	102,760	66,350	41,990	26,050	8,260	6,580	2,450	200	10		254,650
Stevens County											
1938	5,480	3,440	1,910	730	120	10					11,690
1948	7,660	4,740	2,690	1,540	440	340	120	10			17,540
1958	9,470	6,070	3,850	2,390	760	600	220	20			23,380
Spokane County											
1938	4,180	2,630	1,450	550	90	10					8,910
1948	5,840	3,620	2,050	1,170	340	260	90	10			13,380
1958	7,200	4,650	2,940	1,820	580	460	170	10			17,830
Total all counties											
1938	364,610	228,710	126,770	48,270	8,080	780	60				777,280
1948	505,470	313,260	180,070	103,960	30,260	23,810	8,510	610			1,165,950
1958	616,020	399,130	256,310	163,490	55,480	44,840	17,650	1,540	110		1,554,570

^{1/} Assuming no change in area of age classes or depletion by cutting or fire.

L. J. C.

Manufacturing Specifications^{1/} for Western
Red Cedar Poles and Piling

1. TIMBER - All poles shall be properly manufactured from selected, sound, live growing cedar trees.
2. KNOTS - All knots must be absolutely sound. Poles containing rotten knots, rough or bulgy knots, a knot larger than $2\frac{1}{2}$ " in diameter, or a group of knots in any one foot section of the pole the sum of whose diameters exceed nine inches, will not be accepted.
3. ROT - (a) The tops of all poles must be sound and entirely free from rot, splits, shakes, or other defects. (b) The butts should also be sound, although rot located only in the center of the butt may be accepted in a limited quantity of poles, provided the heart rot does not exceed 5 percent of the diameter of the butt. (c) All poles must be free from ring rot, shell rot, sap rot and all evidence of wood rotting fungi.
4. CATFACES - Catfaces are not permitted, except poles containing small catfaces less than 2 inches in depth, when located within 3 feet of the butt end of the pole, may be accepted provided the catface is sound.
5. DEAD OR DRY STREAKS - Poles containing dead or dry streaks will not be accepted unless the dead or dry streak is smooth, sound, free from worm holes, rot or other defects, does not cover more than 20 percent of the surface of the pole and does not extend more than two-thirds of the length of the pole from the butt.
6. CROOK AND SWEEP - (a) Poles having a short crook or kink, reverse sweep, or two-way sweep will not be accepted. (b) One way sweep is permitted, provided a tape tightly stretched from the center of the top to center of the butt, across the arc made by the sweep, does not pass outside the body of the pole at any point.
7. MISCELLANEOUS DEFECTS - All poles shall be free from splits, shakes, cracks, breaks, bird holes, plugged holes, bulges, burls, splintered or worn sapwood, injurious checks, or the evidence of having been attacked by ants, bugs, or powder worms. Exception: pin holes circular in outline, not more than one-sixteenth ($1/16$) of an inch in diameter, and not greater in number than 15 in an area of a 4-inch square, are permitted.

^{1/} More complete specifications may be obtained by writing Western Red and Northern White Cedar Association, Spokane, Washington or Minneapolis, Minnesota.

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Sources of depletion data

1. "Quantity of Wood Treated and Preservatives Used in the United States" by R. K. Helphenstine Jr., Bulletin dating from 1909-1937, inclusive.
2. Copeland Report.
3. Forest Products of Canada, 1912. Bulletin No. 39, Department of Interior, Canada.
4. Production and Consumption of Minor Timber Products in Oregon and Washington (manuscript) by H. M. Johnson.
5. Capper Report, manuscript for Region One of the U.S. Forest Service.
6. Biennial census surveys dating from 1925-1937, and unpublished information supplied by the Forest Survey in the Pacific Northwest.